AMENDMENTS TO THE CLAIMS

The following is a complete listing of revised claims with a status identifier in parenthesis.

LISTING OF CLAIMS

1. (Original) A measuring apparatus for measuring the physical properties of a surface comprising:

– a stage supporting an object with a thickness (T) being provided with a surface, said surface being divided into a number of measurement points, where two adjacent measurement points being spaced a distance apart not exceeding a predetermined maximum distance,

– means to determine the gradient of the surface at each measurement point,

– means to calculate a 2-dimensional local offset (d) in the x-y plane for each measurement point as a function of the gradient, and the thickness (T) of object, and

– means to determine a correction function for the surface using the calculated 2-dimensional local offset (d) for each measurement point.

2. (Original) The measuring apparatus according to claim 1, wherein the means to determine the gradient comprises means to measure the variation in height of the surface at each measurement point.

3.   (Original) The measuring apparatus according to claim 2, wherein the means to measure the variations in height of the surface comprises:

–   means to determine a reference surface,

–   means to measure the height (H) between the reference surface and the surface of the object at each measurement point, whereby

the 2-dimensional local offset (d) is the x-y plane may be calculated as a function of the measured height (H), the distance (P) from each at least adjacent measurement point, and the thickness (T) of the object.

4.   (Original) The measuring apparatus according to claim 1, wherein the object is a reference object, and said surface is provided with marks at each measurement point.

5.   (Original) The measuring apparatus according to claim 1, wherein the measurement points on the object are arranged in a grid pattern having a first predetermined pitch in the x direction and a second predetermined pitch in the y direction.

6.   (Original) The measuring apparatus according to claim 1, wherein the measurement points on the object are arbitrarily arranged.

7.   (Original) A pattern generating apparatus for writing a pattern on a surface of an object, comprising:

–   a stage supporting an object with a thickness (T) being provided with a surface, said surface being divided into a number of measurement points, where two adjacent measurement points being spaced a distance apart not exceeding a predetermined maximum distance,

–   means to determine the gradient of the surface at each measurement point,

–   means to calculate a 2-dimensional local offset (d) in the x-y plane for each measurement point as a function of the gradient, and the thickness (T) of object, and

–   means to correct the pattern to be written on said surface by using the 2-dimensional local offset (d).

8.   (Original) The pattern generating apparatus according to claim 7, wherein the means to correct the pattern comprises:

–   means to determine a correction function for the surface using the calculated 2-dimensional local offset (d) for each measurement point, and

–   means to write the pattern on the surface using the correction function with the pattern generating apparatus.

9.   (Original) The pattern generating apparatus according to claim 7, wherein the means to determine the gradient comprises means to measure the variation in height of the surface at each measurement point.

10. (Original) The pattern generating apparatus according to claim 9, wherein the means to measure the variations in height of the surface comprises:

– means to determine a reference surface,

– means to measure the height (H) between the reference surface and the surface of the object at each measurement point,

whereby the 2-dimensional local offset (d) in the x-y plane may be calculated as a function of the measured height (H), the distance (P) from each at least one adjacent measurement point, and the thickness (T) of the object.

11. (Original) The pattern generating apparatus according to claim 10, wherein the local offset (d) is calculated using the formula:

$d=(T*H)/(2*P)$

12. (Original) The pattern generating apparatus according to claim 7, wherein the measurement points on the object are arranged in a grid pattern having a first predetermined pitch in the x direction and a second predetermined pitch in the y direction.

13. (Original) The pattern generating apparatus according to claim 7, wherein the measurement points on the object are arbitrarily arranged.

14.   (Original) The pattern generating apparatus according to claim 10, wherein the height (H) between the reference surface and the surface of the object originate from unevenness of the stage, and/or unevenness of one or both surfaces of the object and/or undesired objects arranged between the stage and the object.

15.   (Original) The pattern generating apparatus according to claim 14, wherein the undesired objects may be trapped air or particles.

16.   (Original) The pattern generating apparatus according to claim 7, wherein the top surface of the object carries the pattern.

17.   (Original) The pattern generating apparatus according to claim 7, wherein the apparatus is provided with means to calculate the correction function to also compensate for expected deformation from the exposure equipment during subsequent processing steps.

18.   (Original) The pattern generating apparatus according to claim 7, wherein the object is intended for use in exposure equipment.

19.   (Original) The pattern generating apparatus according to claim 18, wherein the object is a glass plate and a pattern is generated on the glass plate

to be used when writing a pattern on a semiconductor material using the exposure equipment.

20.   (Original) The pattern generating apparatus according to claim 7, wherein the object is a semiconductor material and a pattern is directly generated on the surface of the semiconductor material.

21.   (Original) A computer program for performing the following steps:
–   determining the gradient of the surface at each measurement point being defined on a surface of an object having a thickness (T),
–   calculating a 2-dimensional local offset (d) in the x-y plane for each measurement point as a function of the gradient, and the thickness (T) of object, and
–   determining a correction function for the surface, or correcting a pattern to be written on said surface, using the calculated 2-dimensional local offset (d) for each measurement point.

22.   (Original) A computer program product for carrying the computer program as defined in claim 21.

23.   (New) A method for writing a pattern on a surface intended for use in exposure equipment, comprising the steps of:

–   arranging an object having a thickness (T) provided with a surface on a stage of a pattern generating apparatus,

–   dividing the surface into a number of measurement points, where two adjacent measurement points being spaced a distance (P) apart not exceeding a predetermined maximum distance,

–   determining the gradient of the surface at each measurement point,

–   calculating a 2-dimensional local offset (d) in the x-y plane for each measurement point as a function of the gradient, and the thickness (T) of object, and

–   correcting the pattern to be written on said surface by using the 2-dimensional local offset (d).

24.   (New) The method according to claim 23, wherein the step of correcting the pattern comprises the steps:

–   determining a correction function for the surface using the calculated 2-dimensional local offset (d) for each measurement point, and

–   writing the pattern on the surface using the correction function with the pattern generating apparatus.

25. (New) The method according to claim 23, wherein the step of determining the gradient comprises measuring the variation in height of the surface at each measurement point.

26. (New) The method according to claim 25, wherein the step of measuring the variations in height of the surface comprises the steps of:

– determining a reference surface,

– measuring the height (H) between the reference surface and the surface of the object at each measurement point, whereby

the 2-dimensional local offset (d) in the x-y plane may be calculated as a function of the measured height (H), the distance (P) from each at least one adjacent measurement point, and the thickness (T) of the object.

27. (New) The method according to claim 26, wherein the local offset (d) is calculated using the formula:

$d = (T*H)/(2*P)$

28. (New) The method according to claim 25, wherein the measurement points are arranged in a grid structure having a first predetermined pitch in the x direction and a second predetermined pitch in the y direction.

29. (New) The method according to claim 26, wherein the height (H) between the reference surface and the surface of the object originate from unevenness of the stage, and/or unevenness of one or both surfaces of the object and/or undesired objects arranged between the stage and the object.

30.   (New) The method according to claim 29, wherein the undesired objects may be trapped air or particles.

31.   (New) The method according to claim 23, wherein the top surface of the object is selected to carry the pattern.

32.   (New) The method according to claim 23, wherein the correction function also compensates for expected deformation from the exposure equipment during subsequent processing steps.

33.   (New) A method for measuring the physical properties of a surface, including the steps of:
–   arranging an object having a thickness (T) provided with a surface on a stage of a measuring apparatus,
–   dividing a glass plate into a number of measurement point, where two adjacent measurement points being spaced a distance apart not exceeding a predetermined maximum distance,
–   determining the gradient of the surface at each measurement point,
–   calculating a 2-dimensional local offset (d) in the x-y plane for each measurement point as a function of the gradient, and the thickness (T) of object, and
–   determining a correction function for the surface using the calculated 2-dimensional local offset (d) for each measurement point.

34.   (New) The method according to claim 33, wherein the step of determining the gradient comprises measuring the variation in height of the surface at each measurement point.

35.   (New) The method according to claim 34, wherein the step of measuring the variations in height of the surface comprises the steps of:

determining a reference surface,

–   measuring the height (H) between the reference surface and the surface of the object at each measurement point, whereby

the 2-dimensional local offset (d) in the x-y plane may be calculated as a function of the measured height (H), the distance (P) from each at least one adjacent measurement point, and the thickness (T) of the object.

36.   (New) The method according to claim 33, wherein the object is a reference object, and said surface is provided with marks at each measurement point.